

REMARKS

Claims 1-19 are all the claims presently pending in the application. By this amendment, claims 1-7 and 9-19 are amended. The amendments introduce no new matter.

It is noted that the claim amendments herein, if any, are made only to more clearly and completely define the invention and to assure grammatical and idiomatic English and improved form under United States practice, and are not made to distinguish the invention over the prior art, or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-7 and 9-19 stand rejected under 35 U.S.C. §112, second paragraph. The claims are amended to address this rejection. Applicant respectfully requests the Examiner reconsider and withdraw the §112 rejections.

Claims 1-19 stand rejected under 35 U.S.C. §102(e) over Hama (US 7,072,346).

This rejection is respectfully traversed in the following discussion.

THE CLAIMED INVENTION

The claimed invention, as exemplarily described in the embodiment of independent claim 1, relates to a node in an Ethernet network to relay an Ethernet frame.

The node has an element which inserts two or more VLAN tags into the Ethernet frame. The element also removes an inserted VLAN tag from the Ethernet frame. The VLAN tags are inserted to and removed from the Ethernet frame during a frame relay process.

A conventional node in Ethernet is controlled with a network control frame storing the network control information in the payload section and the address of the node to be

controlled in the MAC address and the IP address. If a user uses the entire network bandwidth for data transmission, then the node cannot send the control frame. In addition, the control frame needs to have at least 64 bytes regardless of the control information amount for the node according to Ethernet standard specified by IEEE802.3.

IEEE802.1Q, that provides for the technology related to the VLAN, specifies that a VLAN tag shall be given to a frame during frame relay for network separation. The node that relays conventional Ethernet frames has a function to process at most one VLAN tag at a time in frame relay and a forwarding table to store the VLAN tag information given during such frame relay assures an information area for one VLAN tag only.

Because the VLAN tag in the frame is the information for network separation, the node that relays the frame with VLAN tag does not change the contents of the VLAN tag. The information in the VLAN tag is used for frame transfer only. Further, in transmission of the VLAN frame at the data link layer, the frame is relayed and the transfer port is determined by reference to the MAC address and the VLAN ID.

The conventional node control in Ethernet as described above has several drawbacks. A conventional node in Ethernet as specified in IEEE802.3 is controlled using the frame storing the control information in the payload section and the address of the node to be controlled in the MAC address and the IP address. Thus, while the user uses the entire network bandwidth for data transmission, the node cannot send the control frame. The control frame needs to have at least 64 bytes regardless of the control information amount for the node according to Ethernet standard. If the control frame is frequently sent in the network, it may oppress the bandwidth of the user data. When the VLAN tag is given for frame transfer, several VLAN tags cannot be provided because there is no information area in

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the forwarding table. And, a loop network may be formed in IEEE802.3 Ethernet, because no function to discard frames when a loop of packet transfer is generated in VLAN packet transfer at the data link layer has been realized, the looped packets occupy the network or induce oppression of the packet memory in the system, which results in unstable status of the network.

The claimed invention, on the other hand, provides a frame transfer method and a node in Ethernet that enable transmission of the network control information from the node even while the user is using the network. The frame transfer method and node in Ethernet can minimize oppression of the network bandwidth caused by transmission of the network control information by enabling transmission of the minimum information regardless of the frame restriction. The frame transfer method and node in Ethernet can send a large information amount including the network control information as tags by enabling provision of several tags in Ethernet frame transfer. The frame transfer method and node in Ethernet enable discarding of frames in VLAN packet transfer at the data link layer and to thereby prevent the network from becoming unstable by avoiding occupation of the network by looped packets and oppression of the packet memory in the system.

THE PRIOR ART REJECTIONS

The Hama Reference

Claims 1-19 stand rejected under 35 U.S.C. §102(e) over Hama. The Examiner alleges that the claimed invention is disclosed by Hama. However, Applicant submits that there are features of the claimed invention which are neither disclosed nor suggested in Hama.

With regard to claims 1-10, Hama fails to disclose or suggest at least “A node in an Ethernet network to relay an Ethernet frame, comprising: an element which inserts two or more VLAN tags into said frame and removes an other said inserted VLAN tag in a relay process of said frame,” as recited in independent claim 1.

The Examiner alleges that Hama discloses, “*a node to relay the Ethernet frame comprising: element which inserts two or more VLAN tags (column 5, lines 6-16; column 5, line 58; headers) into said frame and removes said inserted VLAN tag in the relay process of said frame (column 3, line 5; column 5, line 63).*” Office Action, p. 3.

However, the cited passages refer only to the edge router of the MPLS network of Hama’s invention. Hama fails to disclose or suggest such features in a node in an Ethernet network.

The cited passages disclose only,

“With MPLS, shim headers can be stacked and such stacking makes it possible to construct a VPN. More specifically, as shown in (A) of FIG. 25, two shim headers M6, M7 are forwarded upon being stacked in one IP frame. As shown in (B) of FIG. 25, the label (Layer-1 label) of the first shim header M6 is used for forwarding within the MPLS network, and the label (Layer-2 label) of the second shim header M7 is used to identify the VPN line connected to the edge routers 1 and 5. That is, the second label is used for VPN identification. The second label can also be used to identify the user line.”

Hama, col. 5, lines 6-16. Further, Hama specifies that only the second label is used for VPN.

Further, Hama discloses in multiple places that it may be connected externally to an Ethernet network, but is for use in an MPLS network, as distinct from use in an Ethernet network. See: Hama, generally, and Fig. 5, 6, 8, 12, 15; col. 7, lines 12-31; col. 11, line 11 – col. 12, line 3; col. 12, lines 23-37.

Further, Hama fails to disclose or suggest wherein said node in an Ethernet network “removes an other said inserted VLAN tag in a relay process of said frame,” as recited in

independent claim 1.

Instead, Hama discloses only that in a conventional VPN a destination switching hub removes a tag indicating the VID before transmitting to the destination PC. The tag of Hama indicating VID is not removed during routing on the side of communication provider. Hama fails to disclose or suggest a node in an Ethernet network removing an inserted VLAN tag in a relay process of a frame.

"In an instance where the personal computer PC1 transmits a packet to the personal computer terminal PC3, the personal computer terminal PC1 transmits a packet having the MAC address of the persona computer terminal PC3 placed in its header as the destination address. Upon receiving this packet at port P1, the first switching hub SHB1 finds the VID (=10) of the VLAN to which the port P1 belongs from a predetermined table, assigns a tag inclusive of VID=10 to the received packet and transmits the packet from port P3 of VID=10. The tagged packet is then transmitted to the second switching hub SHB2 via the ports P1, P2 of third switching hub SHB3. When the tagged packet arrives at the second switching hub SHB2, the latter removes the tag and transmits the packet to the personal computer terminal PC3 from port P1 (VID=10)."

Hama, col. 2, line 59 – col. 3, line 6; Fig. 21.

Thus, Hama relates to an edge router in an MPLS network, not a node in an Ethernet network. Hama is useable in an MPLS network, not an Ethernet network. Hama relates to IP frames, not Ethernet frames. Hama uses only a single VPN label. Hama discloses a conventional VPN wherein the VID information tag is unchanged and not removed during routing.

Thus, Hama fails to disclose or suggest at least these features of independent claim 1. Claims 2-10 depend from claim 1, and inherit all features and limitations thereof. Applicant submits that claims 2-10 are patentable for at least this reason, as well as for the additional subject matter they recite.

Claims 11-19 recite similar features to claims 1-10, and stand rejected on substantially

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similar basis. Applicant traverses the rejection of claims 11-19 on substantially similar grounds as discussed above.

Thus, Applicant respectfully requests the Examiner reconsider and withdraw the rejection of claims 1-19.

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CONCLUSION

In view of the foregoing, Applicant submits that claims 1-19, all the claims presently pending in the application, are patentably distinct over the prior art of record and are allowable, and that the application is in condition for allowance. Such action would be appreciated.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned attorney at the local telephone number listed below to discuss any other changes deemed necessary for allowance in a telephonic or personal interview.

To the extent necessary, Applicant petitions for an extension of time under 37 CFR §1.136. The Commissioner is authorized to charge any deficiency in fees, including extension of time fees, or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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